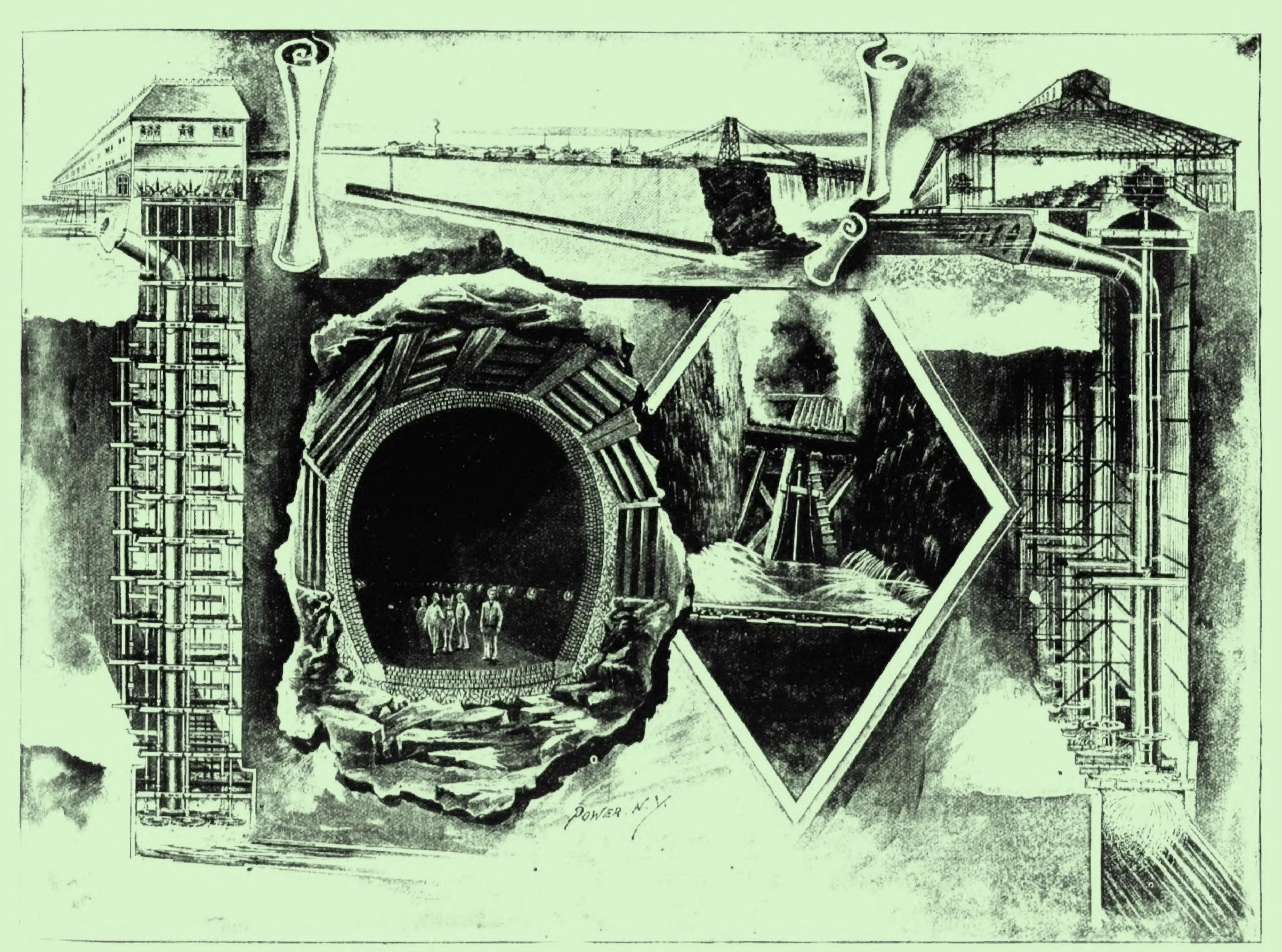


SEVENTEENTH YEAR, No. 10.

MILWAUKEE, OCTOBER, 1892.

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THE GREAT TUNNEL FOR UTILIZING A PART OF THE WATER POWER OF MIAGARA FALLS:

tion of the whole available at least double that of the total the ground, the upper end of and the amount of water en-

THE GREAT TUNNEL AT NIAGARA. make a perceptible difference power at present employed in large tract of land, owned by THE feasibility of developing in the flow over the falls, the United States, the Company, adjacent to the I the heretofore little utilized According to the census of The central feature of the river bank above the village. but enormous power of the 1880, the steam and water work accomplished and which The tunnel has somewhat of a water in its rapid course horse-power employed in the forms the subject of the ac- horseshoe shape, being 19 feet toward the great falls has been manufactures carried on in the companying illustrations, is wide by 21 feet high inside of to an extent demonstrated by United States was 3,410,837 of the great tunnel, 7,600 feet long, the brickwork with which it is the work accomplished by the which 2,185,458 was steam forming the tail race, starting lined throughout. It was, at Niagara Falls Power company, power and 1,225,379 water from the river at just above first, intended to allow the though the proportion of the power. The estimated total the water level, below the rock, through which it passed total power which will be used power of the falls has been, by falls and running under the to form the wall of the tunnel un connection with present the most conservative, placed village of Niagara, at a depth but it was found necessary. preparations is so small a frac- at several million horse-power, of 200 feet below the surface of from the nature of the rock power that it is not expected to combined steam and water the tunnel being beneath a countered, to line it with brick.

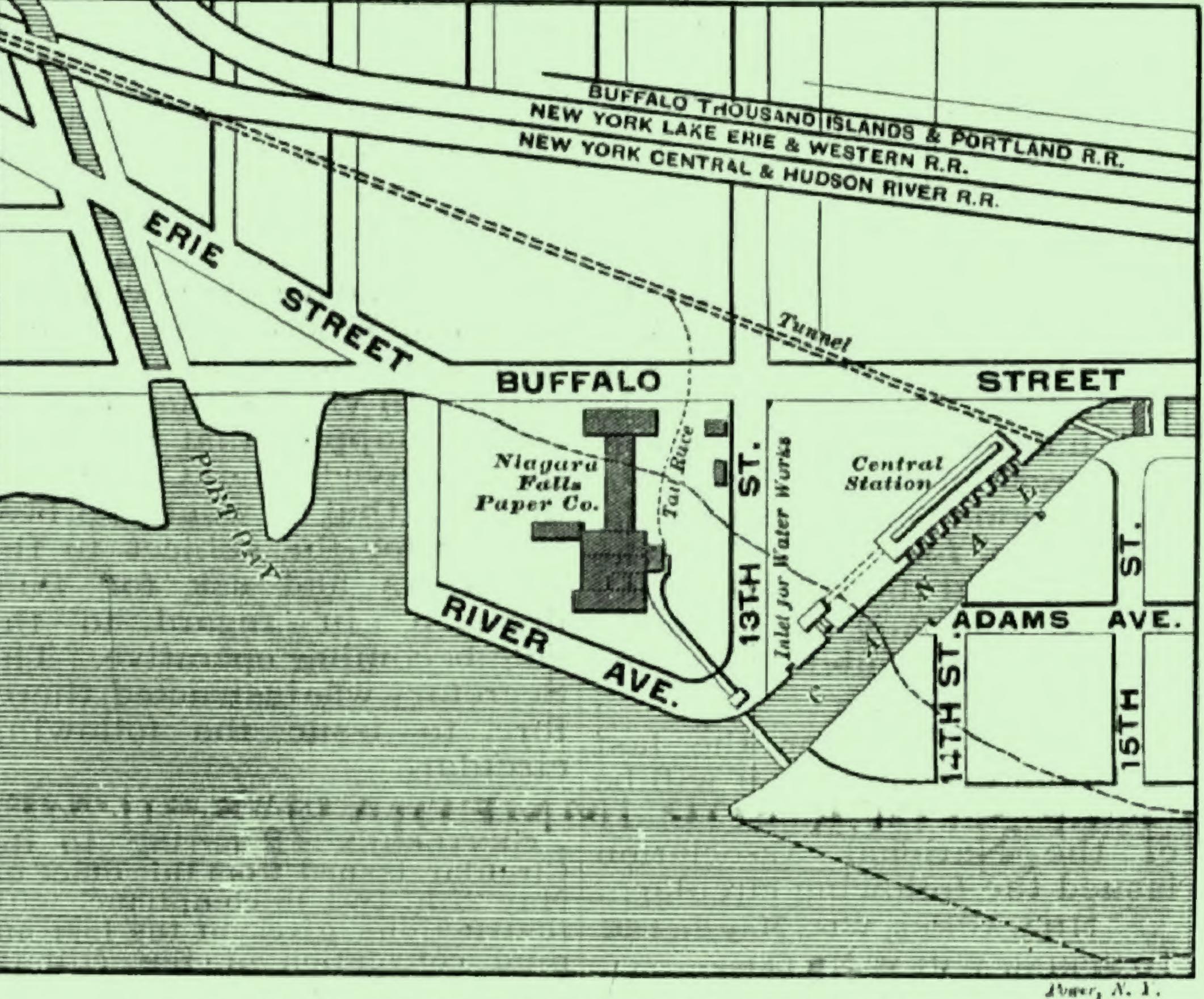
ence of about 200 feet in the level of the water in the canal and the tunnel discharge, about 140 feet of which will be available as working head for the turbines.

To the manufacturer who locates at Niagara, two methods of procuring power are available. He may either put in his own wheel-pit, penstock and wheels, and discharge the water into the tunnel as a tail-race, or he may equip his factory with electric motors and obtain his current from the immense power house which the Company will construct and operate.

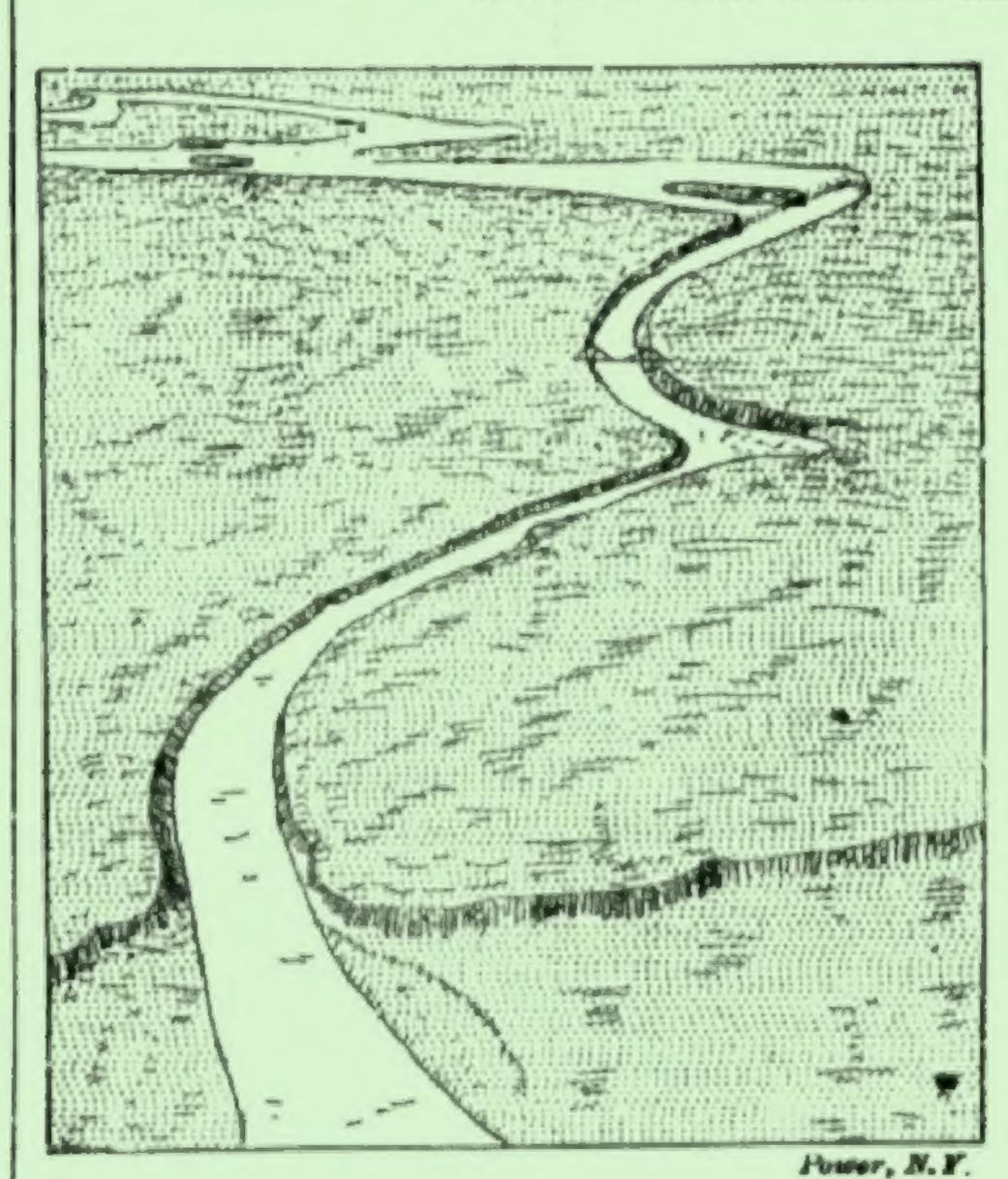
The first establishment to put in an installation upon the first mentioned plan will be the Niagara Falls Paper Co., who are building what will be the largest paper mill in the world, it will be situated as shown on the map, upon reclaimed land at the river side. The water taken from the canal as shown, will be delivered through a single penstock upon six turbines and discharged through a supplementary tunnel, some 800 feet in length, to the main tunnel. From each turbine a vertical shaft extends to the mill above, connecting, through bevel gears, with the pulp-grinding and other machines and shafting. A general idea of the arrangement is shown at the left of the large engraving.

This method of utilizing the power of Niagara will be practicable only for industries of considerable magnitude. For the smaller manufacturer the electric motor, supplied BIRD'S-EYE VIEW OF NIAGARA GORGE. with cheap current from the large power house, where it the running head.

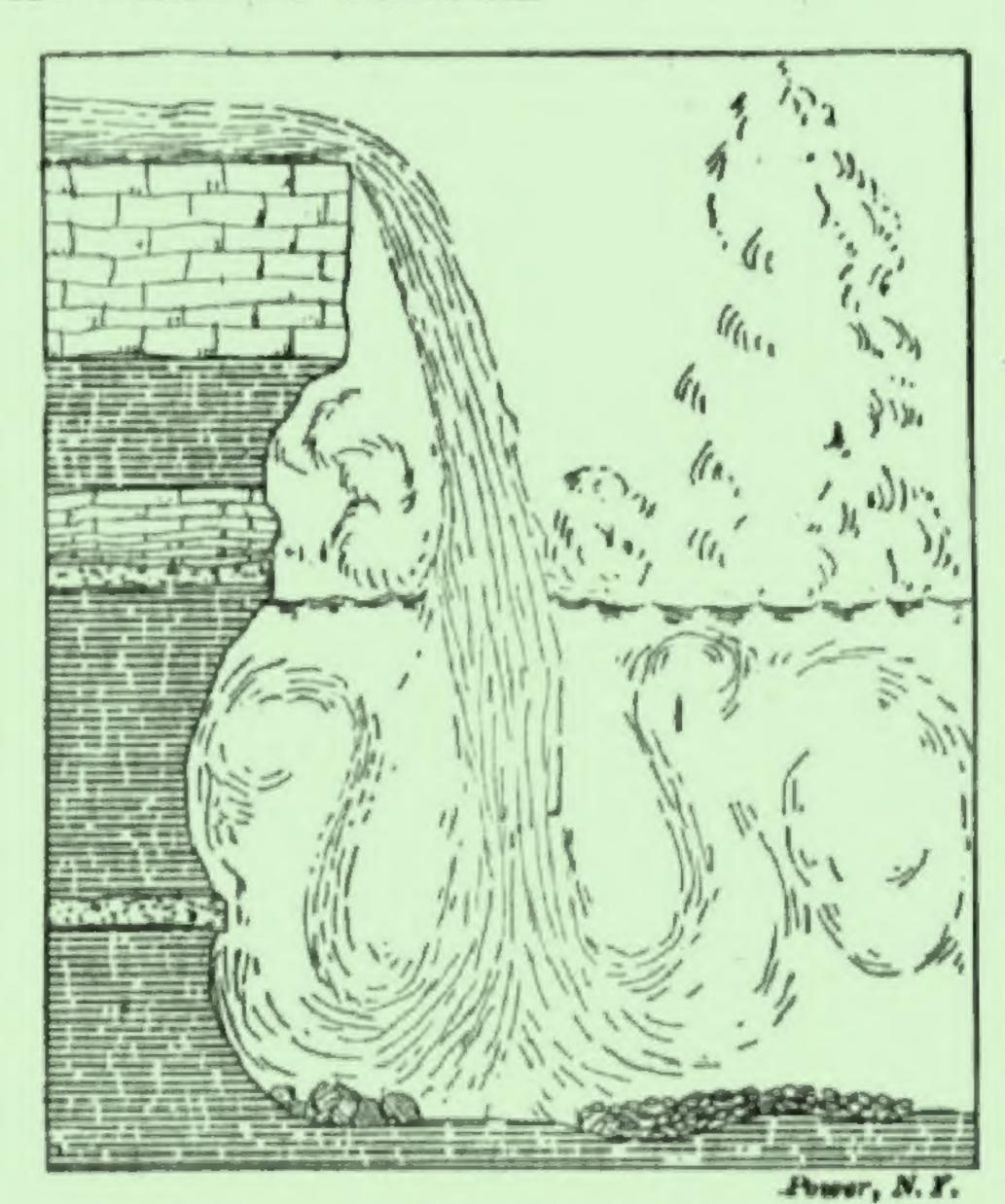
and the rock was filled with engraving. The wheel-pit is and the Falls will, in time, bebroken stone, and cement, the 150 feet in length and 18 feet come one of the largest manusupporting timbers being built in width; the difficulties en- facturing centers ever known. in as shown. The lining has countered from in-rushing The September number of reduced the capacity of the water are suggested in one of Power, to the publishers of tunnel from 120,000 horse power the panels of the engraving, which we are indebted for the at first contemplated, to about which is reproduced from a use of accompanying illustra-100,000 horse-power. It has a photograph, The construction tion and the substance of this cross-sectional area of 365 of a coffer-dam and the con-article, concludes its descripsquare feet for its entire tinual operation of powerful tion with "A bit of Niagra's length. Its grade is about one pumps were found necessary very ancient history," includfoot in 150 and there is a differ- to the prosecution of the work. ing the following:



CANAL AND FACTORIES AT HEAD OF TUNNEL.



Referring to the map, the "At first Lake Erie discharged can be most economically positions of that portion of the across the divide where the city of generated, will doubtless be canal now in progress and the Fort Wayne now stands, running the less costly arrangement. main tunnel are indicated. The To meet this demand the canal will be extended along channel of this discharge and the Niagara Falls Power Co., are Buffalo street or Adams avenue putting in a station at the loca- as shall appear most desirable well preserved. In course of time tion shown on the map. Here when the character and locawill be installed, primarily, two tion of the industries, which turbines of 5,000 horse-power will use it, shall have been deeach. The vertical shaft of the termined, the tunnel being exturbines will carry at their tops tended accordingly. The dotted the armatures of two multipolar line indicates the original shore dynamos, to utilize the capacity line, which will be extended to the surface of Ontario some 550 of the wheel. The weight of the shore lineshown. Although feet, thereby separating it from the bearings is supported by the main tunnel is practicalle Lake Erie and gave rise to Niagara the pressure of the water under complete and ready for thy feet lower than Erie, but the land water, none of the power in- between them is an almost level



SECTION OF NIAGARA FALLS.

into the Wabash River, and thence into the Ohio and Mississippi. The elevated shore lines of that time are the ice, which had filled the Ontario basin, retreated northward, exposed a lower outlet in western New York, in the neighborhood of Oneida Lake, and the waters of the great lakes emptied into the Mokawk, where Rome is now, and thence into the Hudson. This change lowered River. Ontario is now about 300

This has been done in the This station is so designed stallments will be ready to plain until near Lake Ontario, manner shown in the engrav- that it can be extended to an start before Spring. This where there is a bluff, shown at the bottom of the bird's-eye view. On ing, the lining being 16 inches ultimate capacity of 50,000 tunnel will develop one of the this bluff, about where Lewiston in thickness and requiring horse-power. The projected most remarkable powers in the now stands, Niagara Falls first about 15,000,000 bricks. The arrangement is shown in gene- world, and it is prophesied that "set up in business," on a small space between the brickwork ral at the right in the large the country between Buffalo scale, an unknown number of years



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